



## FROM CORALS TO REEFS

**Grades:** Recommended for Grades 7-12

**Objectives:**

1. Students will learn and understand the specific vocabulary associated with coral reefs.
2. Students will learn and understand the conditions required to maintain corals and coral reefs throughout the world's oceans.
3. Students will learn and understand the importance of the coral reef and its role in the earth's ecosystem.

What Do You Know About Coral and Coral Reefs?

- Are corals plants or animals?
- Where are coral reefs found?
- How would you describe coral reefs?
- Why are coral reefs important?

**Vocabulary:**

**Atoll** – A ring of coral reefs that surround a lagoon.

**Barrier Reef** – An offshore reef separated from land by a channel of water.

**Biodiversity** - the variety of life in the world or in a particular habitat or ecosystem.

**Cnidaria** – The Phylum that includes jellyfish, sea anemones, and corals.

**Colony** – Flower-like clusters of polyps

**Coral** – living animals, marine invertebrates typically living in colonies of individual polyps.

**Coral Bleaching** – When coral whitens due to the loss of its symbiotic algae and their pigments. It is the coral version of a forest fire and is not always bad.

**Fringing Reef** – A reef that borders shorelines of continents and Islands.

**Habitat** – The area or environment in which an organism lives.

**Mutualism** – A symbiotic relationship where both organisms benefit.

**Nematocysts** – specialized stinging cells that act as organs of offense and defense.

**Photosynthesis** – The process by which plants and algae use light to produce food from water and carbon dioxide.

**Polyp** – individual animals with a cylindrical body topped with a mouth fringed by tentacles.

**Soft Corals** – contain minute, spiny skeletal elements called sclerites that provide some degree of support and give their flesh a spiky, grainy texture that deters predators. Soft corals do not produce calcium carbonate skeletons.

**Stony Corals** – marine animals in the phylum Cnidaria that produce a hard calcium carbonate shell around the polyp. The reef building corals.

**Symbiosis** – A relationship in which two dissimilar organisms live in close association with one another often to the benefit of both.

**Zooxanthellae** (pronounced zo-zan-THEL-ee) - The algae needed for reef building corals to survive

### **Description:**

Corals are colonial marine invertebrates which are the foundation of large underwater structures we know as coral reefs. Coral reefs, of which there are three types; barrier, fringing, and atoll, are some of the most diverse and valuable ecosystems on earth. Although corals are found throughout the world's oceans, reef building corals are found only in shallower tropical and subtropical waters. Reef building corals prefer water temperatures no less than 64 degrees F, with optimal growing temperature being between 73 and 84 degrees F. They usually need to be in clear, shallow water less than 150 feet deep so they can acquire enough sunlight to allow for photosynthesis needed to keep their zooxanthellae alive. There are over 2,500 species of corals. Approximately 1,000 are the hard corals that build reefs. The remaining corals are soft corals which have skeletons that are flexible.

Reefs are formed by millions of individual animals called polyps which are connected to one another within the colony. Coral polyps are tiny, soft-bodied organisms related to sea anemones and jellyfish (Phylum- Cnidaria). At their base is a hard, protective limestone skeleton called a calicle, which forms the structure of coral reefs. Reefs begin when a polyp attaches itself to a rock on the sea floor, then divides, or buds, into thousands of clones.

Symbiotic relationships, partnerships between coral and their zooxanthellae, are abundant in the coral reef. Each organism within a symbiotic relationship depends upon and benefits from these mutualistic unions. Coral reefs support a wide range of plants and animals maintaining balanced relationships within our marine ecosystem. Some of the many colorful fish found throughout coral reefs include: Angelfish, Anthias, Butterflyfish, Damselfish, Gobies, Parrotfish, Surgeonfish, Tangs, Triggerfish, and Wrasses. Green turtles, loggerhead turtles, Wobbegong sharks, white tip and black tip reef sharks and the giant clam are but a few more species found amongst coral reefs.

The largest coral reef on the planet, The Great Barrier Reef, can be found along the northeast coast of Australia. Warm, clean, clear, shallower salt water, solid rocks for coral to grow on, ocean currents to bring in food, everything corals need to grow can be found in Australia's coastal waters.

Global concern for the health of coral reefs in our oceans has brought attention to the need for increased efforts in regard to maintaining the balance of the ecosystem. Coral bleaching, for example, can be caused by an array of stressors. Water that is too cold or too hot, too much or too little light, may cause coral polyps to lose their zooxanthellae. Global warming is the biggest concern today. A rise in temperature of more than 2 degrees can cause bleaching. In addition, coral reefs can be compromised by runoff from lawns, cities, and sewage. Threats can come in the form of careless divers and boat anchors. Invasive species (such as the lionfish) can negatively impact coral reefs by competing with native coral reef animals. Loss of coral reefs will mean a decrease in economies supported by tourism and commercial fishing, coastline protection from storms will diminish and loss of food and shelter for the complex web of organisms leading all the way to humans. Education, conservation and preservation is extremely important for the long term survival of earth's coral reefs.

### **Long Island Aquarium Experience**

During your visit to the Long Island Aquarium you will observe a 20,000-gallon coral reef tank that is meticulously maintained by our curator.

\*The coral reef tank at the Long Island Aquarium is the third largest *all-living* coral reef exhibit in the United States and one of the most respected tanks in the world. It has 20,000 gallons of seawater and must be kept warm (76°-78° F) and well lit, (25,000 watts of light) to stimulate growth of algae (zooxanthellae) that lives within the corals. The algae provide food for the corals and are responsible for some of the beautiful colors.

\*In addition to all of the colorful fish, you see swimming about the coral, flashlight fish that hide among the coral by day, come out at night. They are able to create their own light, called *bioluminescence*, which is similar to the green glow produced by fireflies. The light helps them to see and catch small prey that is attracted to the pale green glow.

**Activity:**

Identify the risk factors associated with coral reefs in the picture below....

